### (19) World Intellectual Property Organization International Bureau





## (43) International Publication Date 30 October 2003 (30.10.2003)

### PCT

# (10) International Publication Number WO 03/08991 A3

(51) International Patent Classification<sup>7</sup>: G03F 7/00, 7/032, 7/033, 7/038, 7/075

(21) International Application Number: PCT/EP03/04231

(22) International Filing Date: 18 April 2003 (18.04.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10/125,508

19 April 2002 (19.04.2002) U.

(71) Applicant (for all designated States except US): VAN-TICO AG [CH/CH]; Klybeckstrasse 200, CH-4057 Basel (CH).

(72) Inventors; and

(75) Inventors/Applicants (for US only): JOHNSON, David, Lanham [US/US]; 5121 San Fernando Road West, Los Angeles, CA 90039-1011 (US). FONG, John, Wai [US/US]; 5121 San Fernando Road West, Los Angeles, CA 90039-1011 (US).

(74) Agents: HEDLEY, Nicholas, James, Matthew et al.; Kilburn & Strode, 20 Red Lion Street, London WC1R 4PJ (GB). (81) Designated States (national): AE, AG, AI, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Published:

with international search report

(88) Date of publication of the international search report: 24 December 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A

### (54) Title: PHOTOCURABLE COMPOSITIONS CONTAINING REACTIVE PARTICLES

(57) Abstract: A photocurable composition, including (a) a photocurable monomer, e.g. a cationically curable monomer and/or a radically curable monomer; (b) reactive particles comprising a crosslinked elastomeric core, e.g. made of polysiloxane material, and a shell of reactive groups on an outer surface of the core, wherein the reactive groups comprise epoxy groups, ethylenically unsaturated groups, or hydroxy groups; and (c) an appropriate photoinitiator, e.g. a radical photoinitiator; and a cationic photoinitiator. A method of making a 3-D object from such a composition and a 3-D object made by the method are also provided. The cured composition generally has a smooth surface. The use of the reactive particles makes the composition more stable and the particles do not readily separate out.

VO 03/089991

### INTL MATIONAL SEARCH REPORT

Application No 2/04231

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G03F7/00 G03F7/032

G03F7/033

G03F7/038

G03F7/075

According to International Patent Classification (IPC) or to both national classification and IPC

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  $IPC\ 7\ G03F$ 

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

### EPO-Internal

Category °	Citation of document, with indication, where appropriate, of	the relevant passages	Relevant to claim No.
X	WO 01 95030 A (JSR CORP ;TANA (JP); UKACHI TAKASHI (JP); JA 13 December 2001 (2001-12-13)	PAN FINE CO)	1,2, 8-10, 15-18, 24,25, 27-29
	page 34, line 1 - line 9; cla examples; table 1	ims;	
X	WO 00 63272 A (JSR CORP ;KATO (JP); TANABE TOYOKAZU (JP); U 26 October 2000 (2000-10-26)	) YUKITOSHI UKACHI TAKASH)	1-4, 8-10, 15-18, 20, 23-25,
	page 40, line 19 -page 41, li examples page 41, line 13 - line 21	ne 2; claims;	
		-/	
X Fur	ther documents are listed in the conlinuation of box C.	Patent family members are list	ed in annex.
'A' docum	ategories of cited documents:  nent defining the general state of the art which is not dered to be of particular relevance document but published on or after the international date	<ul> <li>"T" later document published after the interpretation or priority date and not in conflict with cited to understand the principle or invention</li> <li>"X" document of particular relevance; the cannot be considered novel or can</li> </ul>	theory underlying the

"t" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  "O" document referring to an oral disclosure, use, exhibition or other means  "P" document published prior to the international filing date but later than the priority date claimed	cannot be considered novel or cannot be considered to Involve an inventive step when the document is taken alone  "Y" document of particular relevance; the claimed invention cannot be considered to Involve an Inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  "&" document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report		
17 September 2003	09/10/2003		
Name and mailing address of the ISA  European Patent Office, P.B. 5818 Patentlaan 2	Authorized officer		
NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Heywood, C		
Form PCT/ICA/PSID (second sheet) ( July 1992)			

# INT\ NATIONAL SEARCH REPORT

Internation Application No PCT/EP 04231

	ation) DOCUMENTS CONSIDERED TO BE RELEVANT	Colouret to staim No.
Calegory °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 938 026 A (JSR CORP ; JAPAN FINE COATINGS CO LTD (JP); DSM NV (NL)) 25 August 1999 (1999-08-25) paragraphs '0038!-'0047!,'0059!,'0061!,'0093!; claims; examples	1-4,8,9, 15-18, 20,23
X	US 5 707 773 A (SWATTON DAVID WILLIAM ET AL) 13 January 1998 (1998-01-13) claims; examples	1,3
X	EP 0 640 876 A (DU PONT) 1 March 1995 (1995-03-01) claims; examples	1,3
Α	EP 0 403 758 A (DU PONT) 27 December 1990 (1990-12-27) cited in the application claims	1-29
А	EP 0 393 675 A (DU PONT) 24 October 1990 (1990-10-24) page 8, line 9 - line 12	1-29
A	US 5 461 088 A (SCHULTHESS ADRIAN ET AL) 24 October 1995 (1995-10-24) cited in the application the whole document	1-29
A	US 2001/046642 A1 (PATEL RANJANA C ET AL) 29 November 2001 (2001-11-29) cited in the application examples	1-29
Α	US 5 476 748 A (SCHULTHESS ADRIAN ET AL) 19 December 1995 (1995–12–19) cited in the application the whole document	1-29

INT. NATIONAL SEARCH REPORT

International Application No PCT/EF

		γ	10171	
Patent document cited in search report	Publication date		Patent family member(s)	Publication date
WO 0195030 A	13-12-2001	JP JP AU EP WO US	2001354996 A 2002060463 A 7466201 A 1299770 A2 0195030 A2 2003059708 A1	25-12-2001 26-02-2002 17-12-2001 09-04-2003 13-12-2001 27-03-2003
WO 0063272 A	26-10-2000	JP CN EP WO US	2000302964 A 1354763 T 1171502 A1 0063272 A1 2002132872 A1	31-10-2000 19-06-2002 16-01-2002 26-10-2000 19-09-2002
EP 0938026 A	25-08-1999	JP JP JP EP US US	11228610 A 11240939 A 11310626 A 0938026 A1 6287745 B1 2002048717 A1	24-08-1999 07-09-1999 09-11-1999 25-08-1999 11-09-2001 25-04-2002
US 5707773 A	13-01-1998	US CA DE DE DE EP JP	6210854 B1 2130159 A1 69402783 D1 69402783 T2 0640876 A1 2793963 B2 7084369 A	03-04-2001 28-02-1995 28-05-1997 25-09-1997 01-03-1995 03-09-1998 31-03-1995
EP 0640876 A	01-03-1995	US CA DE DE EP JP JP US	6210854 B1 2130159 A1 69402783 D1 69402783 T2 0640876 A1 2793963 B2 7084369 A 5707773 A	03-04-2001 28-02-1995 28-05-1997 25-09-1997 01-03-1995 03-09-1998 31-03-1995 13-01-1998
EP 0403758 A	27-12-1990	US AU CA CN DE DE EP JP JP	5002854 A 633557 B2 5376090 A 2014809 A1 1048935 A 69020649 D1 69020649 T2 0403758 A2 2043870 C 3114733 A 6061850 B	26-03-1991 04-02-1993 25-10-1990 21-10-1990 30-01-1991 10-08-1995 11-01-1996 27-12-1990 09-04-1996 15-05-1991 17-08-1994
EP 0393675 A	24-10-1990	US AU CA CN DE DE EP HK	4942066 A 623247 B2 5376690 A 2014804 A1 1048934 A 69021246 D1 69021246 T2 0393675 A1 53897 A	17-07-1990 07-05-1992 25-10-1990 21-10-1990 30-01-1991 07-09-1995 15-02-1996 24-10-1990 02-05-1997

# IN\ NATIONAL SEARCH REPORT

International Application No PCT/E 3/04231

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0393675	A		JP JP	3015520 A 6061848 B	23-01-1991 17-08-1994
US 5461088	A	24-10-1995	AU CA EP JP US AT AU DE ES	7149094 A 2117572 A1 0643329 A2 7097403 A 5629133 A 175034 T 674247 B2 59407524 D1 2127365 T3	09-03-1995 27-02-1995 15-03-1995 11-04-1995 13-05-1997 15-01-1999 12-12-1996 04-02-1999 16-04-1999
US 2001046642	A1	29-11-2001	AU CA CN WO EP JP	3023301 A 2398160 A1 1422394 T 0159524 A1 1256032 A1 2003522821 T	20-08-2001 16-08-2001 04-06-2003 16-08-2001 13-11-2002 29-07-2003
US 5476748	A	19-12-1995	AT AU CA DE EP ES JP	151085 T 658780 B2 5252493 A 2111718 A1 59306034 D1 0605361 A2 2100513 T3 3203461 B2 6228413 A	15-04-1997 27-04-1995 30-06-1994 22-06-1994 07-05-1997 06-07-1994 16-06-1997 27-08-2001 16-08-1994